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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/817,031	03/27/2001	Xiaoning Nie	P20721.P05	7309

7055 7590 05/04/2006

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EXAMINER

GAYESKI, MICHAEL R

ART UNIT PAPER NUMBER

2143

DATE MAILED: 05/04/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/817,031	Applicant(s) NIE, XIAONING	
	Examiner Michael R. Gayeski	Art Unit 2143	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 02 February 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 21-31 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 21-31 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 02 February 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. The amendment filed 2/2/2006 has been entered. Claims 30 and 31 are newly added. Claim 25 is canceled. Accordingly, claims 21-24 and 26-31 remain pending.

Response to Arguments

2. Applicant's arguments, see "Remarks", Page 1, Paragraphs 2 and 3, filed 2/22/2006, with respect to regarding the objections to the drawings, and rejections under 35 USC 112 2nd paragraph have been fully considered and are persuasive. The objection to the drawings, as well as the rejections under 35 USC 112 2nd paragraph of claims 22 and 26-28 have been withdrawn.

3. Applicant's arguments, see "Remarks", Page 1, Paragraph 4 – Page 10, Paragraphs 2 and 3, filed 2/22/2006, with respect to the rejection of claims 21-24 and 26-29 under 35 USC 103(a) have been fully considered but are not persuasive.

4. Applicant first argues that the system of Bestavros requires an external router to forward packets between host devices, and thus is substantially different from Applicant's claimed invention ("Remarks", Page 9, Paragraphs 1, 2, and 3). Examiner respectfully disagrees with this conclusion.

Applicant correctly notes that the system of Bestavros uses IP encapsulation to forward packets between hosts on a different LAN. However, IP encapsulation is used only when a packet needs to be re-directed to a server outside the LAN: when both the source and target destination devices are on the same LAN, Bestavros uses a 'Media

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Access Control (MAC) rewriting technique' for forwarding packets (See, *inter alia*, Bestavros, Column 3, lines 49-54; and Column 4, lines 1-11). Thus, by changing a MAC address of a packet and re-transmitting it on the LAN, the system of Bestavros is able to re-route packets between servers without the use of an external router, so long as both the source and destination servers are present on the same LAN.

Examiner has interpreted the MAC address inherent to all Ethernet frames (and specifically used by Bestavros) to be equivalent to Applicant's claimed 'internal server address,' as Bestavros' MAC rewriting technique is only used when re-routing a packet between two computers on the same LAN (i.e. internal servers) (See, *inter alia*, Bestavros, Column 4, lines 6-11). Furthermore, by making the LAN 22 of Bestavros a switched Ethernet LAN as taught by Sportack, one of ordinary skill in the art would arrive at Applicant's claimed invention.

5. Applicant further argues that the system of Bestavros teaches routing using Layer-3 (i.e. IPIP encapsulation) elements, rather than the Layer-2 (i.e. switching) elements of Applicant's claimed invention ("Remarks", Page 9, Paragraph 3), and thus, external routers are required. Examiner respectfully notes that while IPIP encapsulation is indeed used to route packets between server modules on separate LANs, the combination of Bestavros-Sportack also uses Layer-2 switching (i.e. MAC address rewriting) to route frames between servers on the same LAN.

Thus, claim 21 stands rejected under 35 USC § 103.

Claim Rejections - 35 USC § 112

6. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

7. Claim **22** is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

8. With regard to **claim 22**, it is unclear as to which of the data modules the claim refers to. Examiner suggests amending the claim to read: "[...] wherein *said at least one data processor of said server module* processes data of a [...]".

Claim Rejections - 35 USC § 103

1. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.
2. **Claims 21-24 and 26-29** are rejected under 35 U.S.C. 103(a) as being unpatentable over Bestavros et al. (U.S. Patent 6,370,584) in view of High Performance Networking, by Mark A. Sportack et al. (hereinafter referred to as Bestavros and Sportack, respectively).
3. With regard to **claim 21**, Bestavros teaches a modularly designed server having a plurality of server modules [See Figure 1, items 10, 12, 14, etc...; and Column 2, lines 14 and 15: A computer cluster is modular], each server module of said plurality of server modules comprising:

at least one processor that processes a data packet **[Column 3, lines 21-54]**;

at least one addressable communications interface that connects to a first local network via which the data packet is transmittable **[Figure 1, item 22]**;

an interface that connects said server module to a LAN device of the modularly designed server **[Figure 1, item 22]** to forward the data packet received by the at least one addressable communication interface to a second server module of the modularly designed server **[Column 3, lines 3-13 and 36-54]** connected to a second local area network **[Column 4, lines 12-15]**, said interface including a routing calculator that calculates an internal server module address **[Column 3, lines 50-54: i.e. a MAC address]** using a routing table based upon a utilization level of data processors of said plurality of server modules of the modularly designed server **[Column 3, lines 36-50]**, such that forwarding of the data packet requires no independent router **[Column 4, lines 6-11]**.

4. Bestavros teaches the invention substantially as claimed, but is silent on the inclusion of *a switching interface that connects said server module to a switching device of the modularly designed server*. Rather, Bestavros teaches that the server modules modify the MAC address of the Ethernet frame to correspond with the target server **[Bestavros, Column 4, lines 5-11]**, thus re-routing the packet to the proper server on the subnet. However, it is known in the art that servers on the same Ethernet segment

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may be connected by an Ethernet switch, wherein the Ethernet switch switches frames based on the MAC address of said frames. For example, Sportack, in the analogous art of computer networking, teaches connecting a switch to a network [See Sportack, page 146, Paragraph 4], and integrating a switched adapter into a network server [See Sportack, Page 150, Heading "Network Servers"], thus providing a switched addressable interface.

5. It would have been obvious to one of ordinary skill in the art at the time of the Applicant's invention to include a switched interface on each module, and a central switch in the network of Bestavros, with the motivation of providing a cost-effective way to increase the performance of the network [See Sportack, page 153, "Summary"].

6. With regard to **claims 22 and 23**, Bestavros additionally teaches that the server processes data packets of a particular prescribed application type; and that the data packet contains information of the prescribed application type, and that the server module address is calculated in accordance with the particular prescribed application type [See Bestavros, Column 3, lines 41-46].

7. With regard to **claim 24**, Bestavros teaches the substantive limitations of the claim, but is silent on including a buffer for temporarily storing data packets. However, the Examiner takes Official Notice that both the technique and benefits of including a buffer in such a system are well known in the art. Accordingly, it would have been obvious to one of ordinary skill in the art at the time of the Applicant's invention to buffer

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the incoming data packets, with the motivation of increasing the performance of the network interface.

8. With regard to **claim 27**, it presents no substantive limitations not addressed in the citations as applied to claim 1, and is rejected for similar reasons.

9. With regard to **claim 28**, Bestavros further teaches that the routing table is updated based on assigned application types **[See Bestavros, Column 3, lines 44 and 45]**, and priority information for the data packet **[See Bestavros, Column 3, line 46: QoS (Quality of Service) specifies a minimum service priority for a packet]**.

10. With regard to **claim 29**, Bestavros further teaches that a data process executed on one server module is transmitted to data processing units of other server modules when the utilization level of the data processing unit of a particular server module exceeds a predetermined level **[See Column 3, lines 15-54: The service can be readily moved from one server to another]**.

11. With regard to **claim 31**, Bestavros further teaches the plurality of servers being connected via a data line **[Bestavros, Figure 1, item 22: An Ethernet LAN inherently comprises at least one data line]**.

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12. Claim **26** is rejected under 35 U.S.C. 103(a) as being unpatentable over Bestavros in view of Sportack as applied to claim 21, and further in view of TCP/IP Illustrated Volume 1: The Protocols, by W. Richard Stevens (Hereinafter 'Stevens').

13. Bestavros-Sportack teaches the invention substantially as claimed, but is silent *on the routing server transmitting a current routing table to the other server modules near the switching interface*. However, the technique and desirability of distributing routing tables to other routers known in the art, and a variety of dynamic routing protocols exist to provide desirable solutions to this particular problem. Stevens, in the analogous art of networking, describes the RIP the protocol, which teaches sending a routing table to all other servers **[See Stevens, Page 131, Paragraph 2: "Regular routing updates. Every 30 seconds..."]**.

It would have been obvious to one of ordinary skill in the art at the time of the Applicant's invention to include a dynamic routing protocol, since Stevens teaches that it is a desirable feature to have in networked systems with more than one router **[See Stephens, Page 127, Section 10.1]**, and the main focus of the system of Bestavros is to provide multiple routers **[See Bestavros, Abstract]**.

Thus, claim 26 is rejected.

14. Claim **30** is rejected under 35 U.S.C. 103(a) as being unpatentable over Bestavros in view of Sportack as applied to claim 21, and further in view of U.S. Patent Application Publication 2001/0011314 (hereinafter 'Gallagher').

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15. With regard to **claim 30**, the combination of Bestavros-Sportack described immediately above teaches the substantive limitations of the base claim, but is silent on each server module of said plurality of server modules being connected together via an internal data bus. Gallagher, in analogous art, teaches a plurality of fully functional server modules, wherein each server module is connected to a backplane (i.e. internal data bus), wherein the backplane further includes an Ethernet network [**See Gallagher, Abstract; Paragraphs 9,10, and 74-87**]. Combining the teachings of Bestavros-Sportack with the teachings of Gallagher by making each server module (**10, 12, 16, 18**) of Bestavros a hot-replaceable processing unit **28** as taught by Gallagher, and further making the Ethernet buses of Gallagher and Bestavros a switched Ethernet network as taught by Sportack would yield the invention as claimed.

It would have been obvious to one of ordinary skill in the art at the time of the Applicant's invention to perform such a combination, as Gallagher explicitly teaches that consolidating servers in such a way provides significant cost savings [**Gallagher, Paragraph 56**].

Thus, claim 30 is rejected.

Conclusion

16. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Distributed Packet Rewriting appears to be a research paper related to the Bestavros patent. See Page 7, Paragraph 3 for a similar description of the MAC address rewriting technique.

U.S. Patent 6,266,335 teaches a network switch for re-routing packets based on server utilization and Layer-2 addresses. However, an external switch rather than the server modules themselves is responsible for re-routing the packets.

U.S. Patent 6,424,621 teaches a modularly designed server with distributed switching functionality. However, when routing a packet to an internal server module, the system relies on a shared-memory implementation rather than a switch.

17. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

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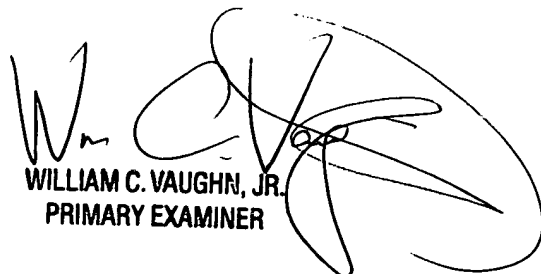
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael R. Gayeski whose telephone number is 571-272-0978. The examiner can normally be reached on M-F: 8:00AM-4:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Wiley can be reached on 571-272-3923. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Michael R Gayeski
Examiner
Art Unit 2143

mrg
4/12/06


WILLIAM C. VAUGHN, JR.
PRIMARY EXAMINER